

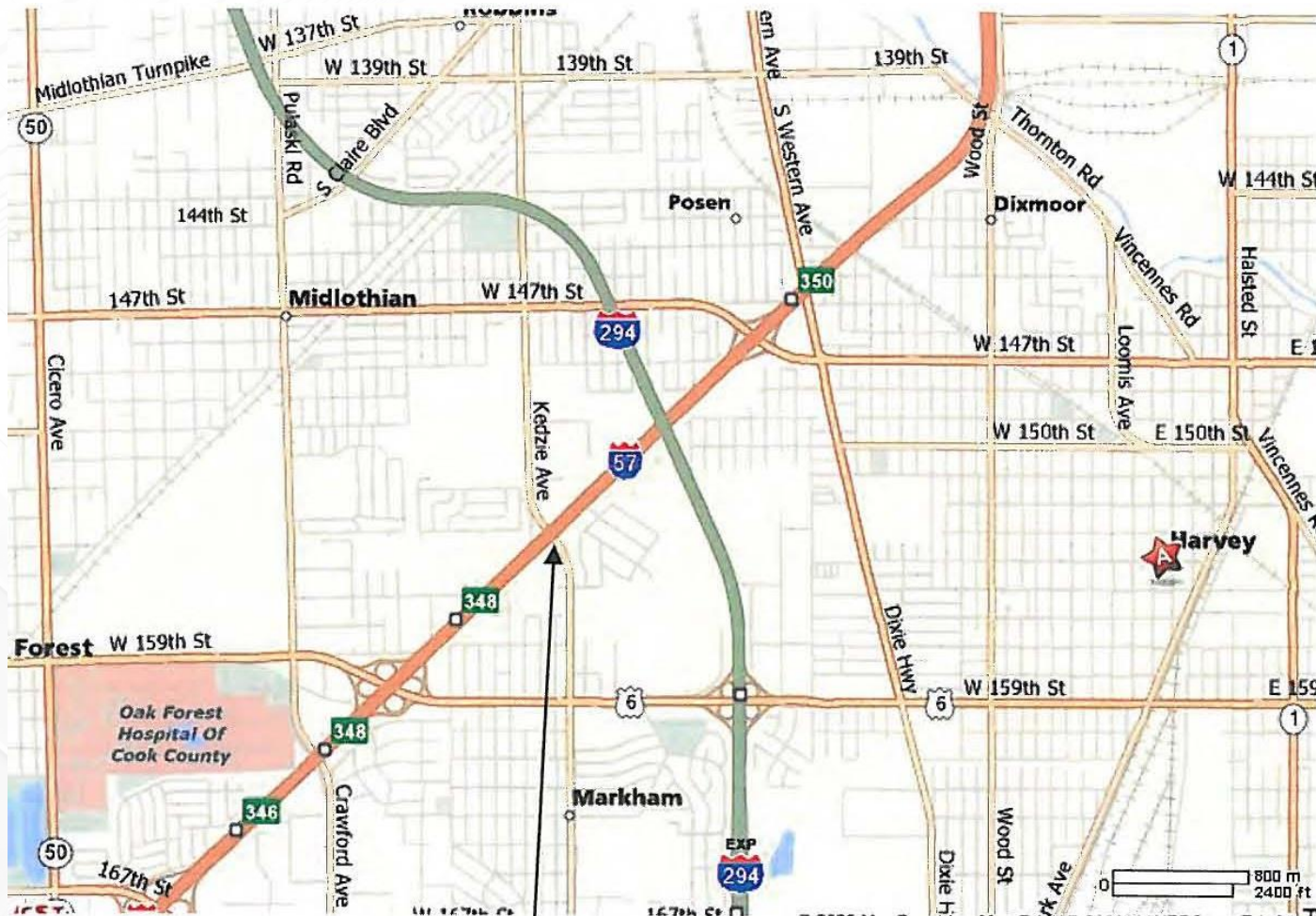


## **Case Study: I-57 & I-294 Interchange**

### **Relocation of I-57 Drainage Ditch Floodway**

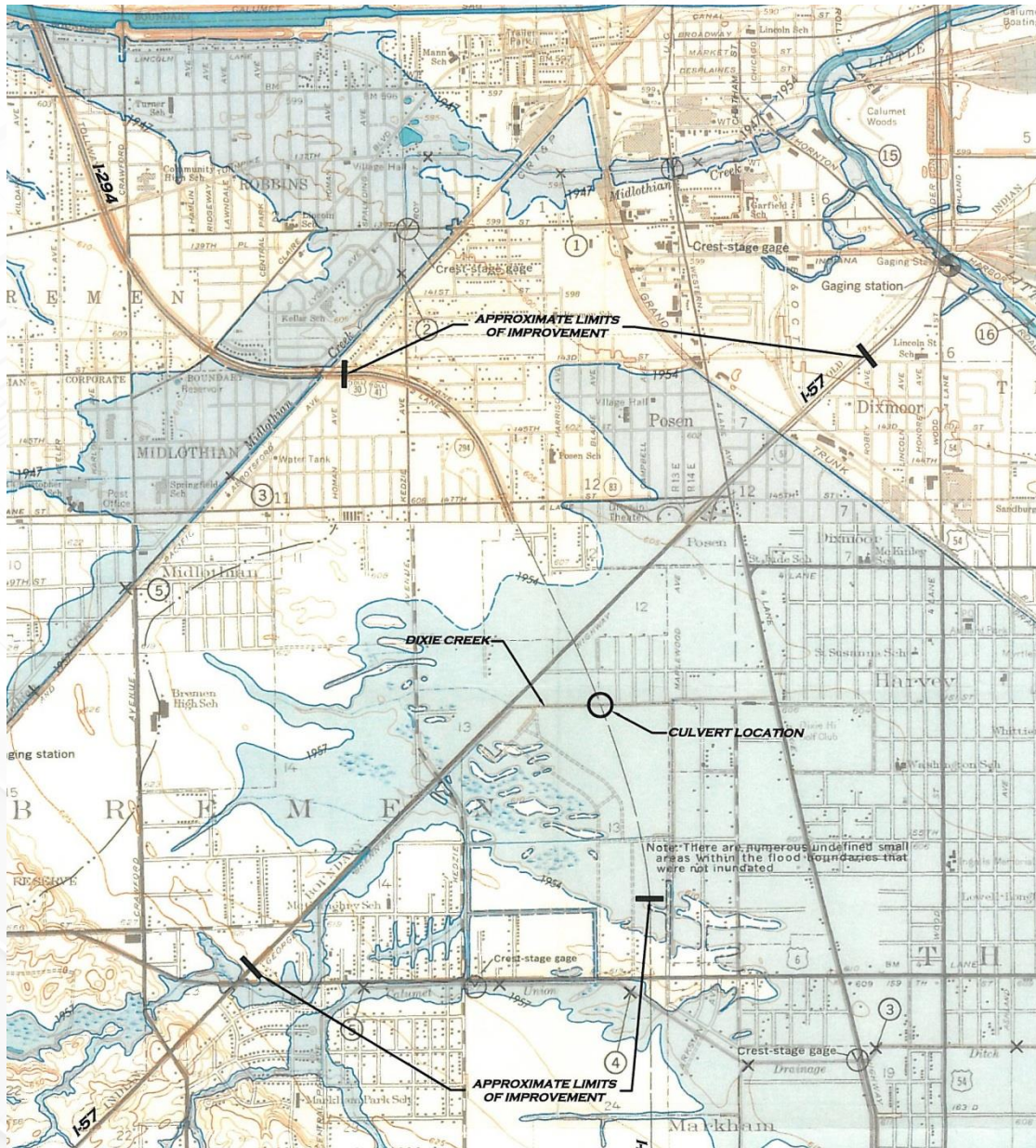
Village of Markham &  
Cook County, IL

# Project Location



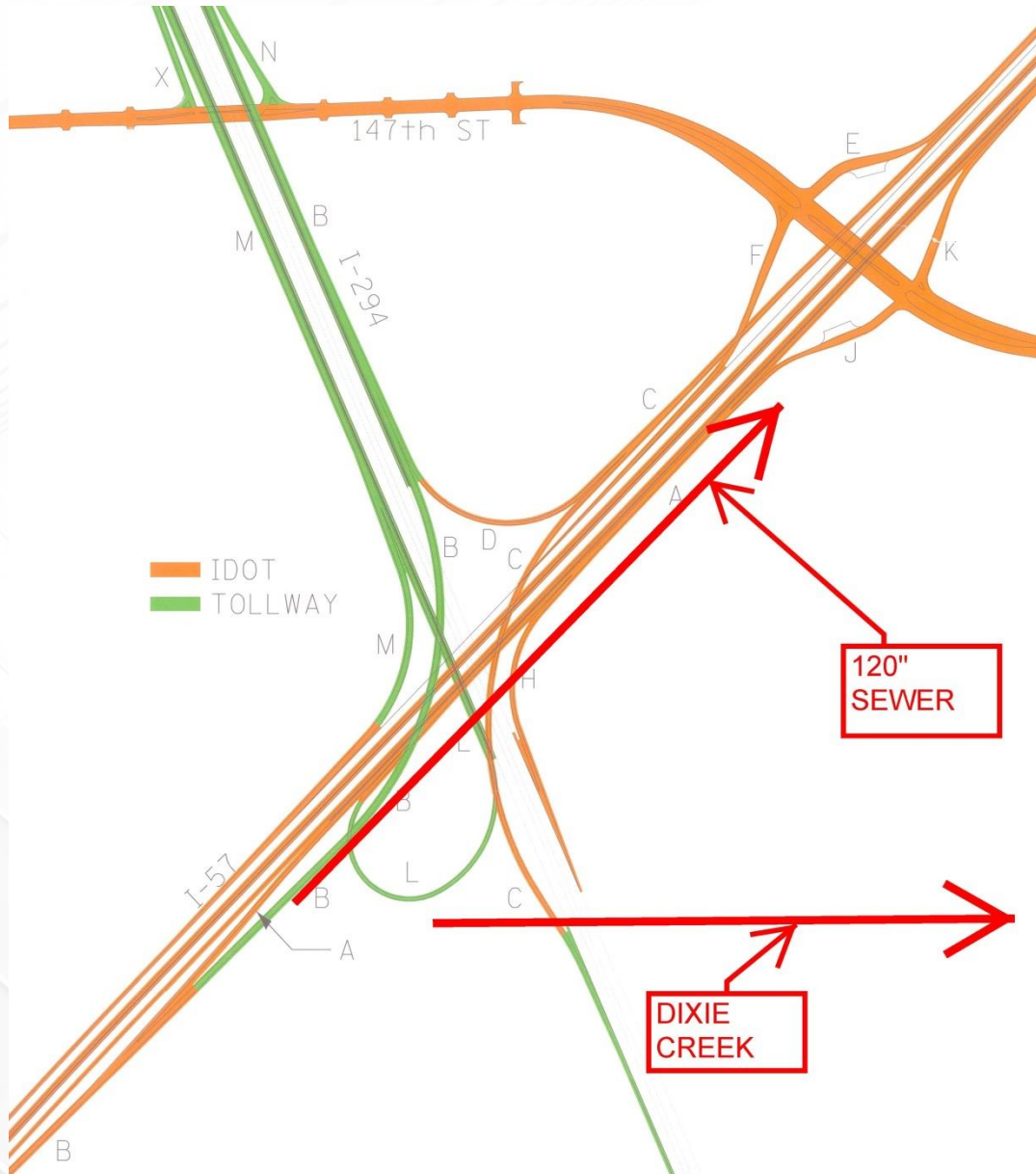


# Historic Flooding



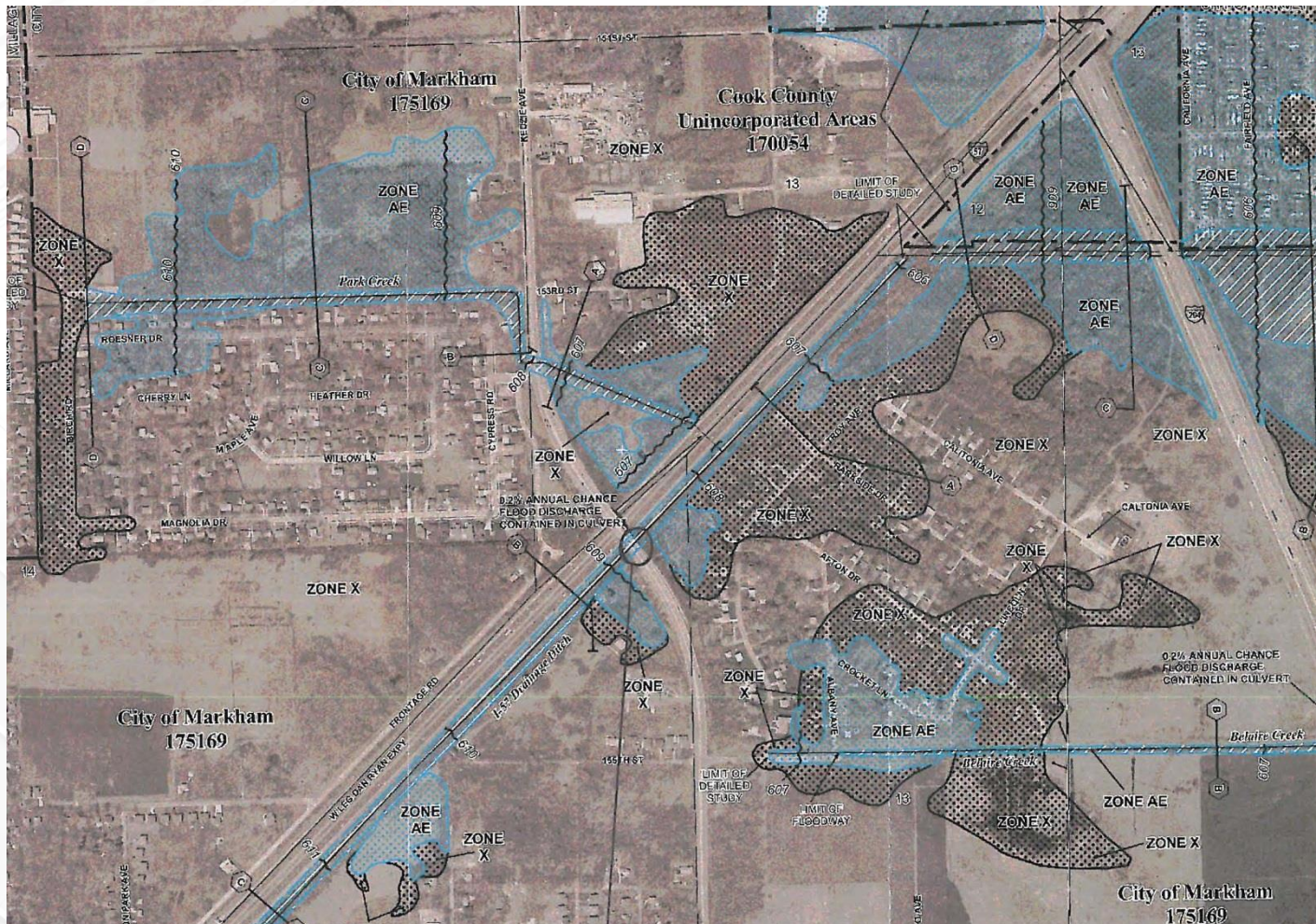


# Outlet Locations





# Current FIRM







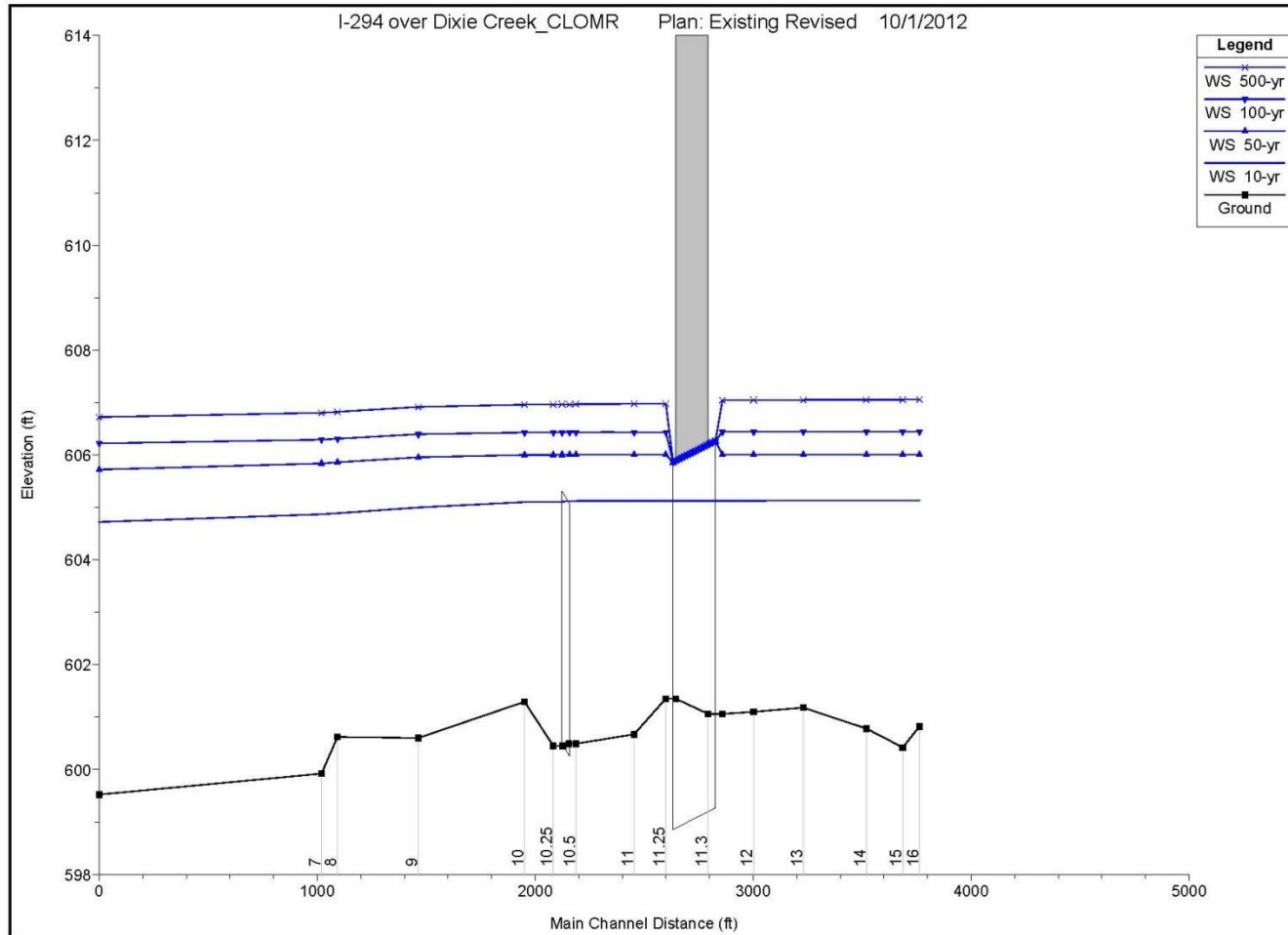


# 120" Sewer Headwall

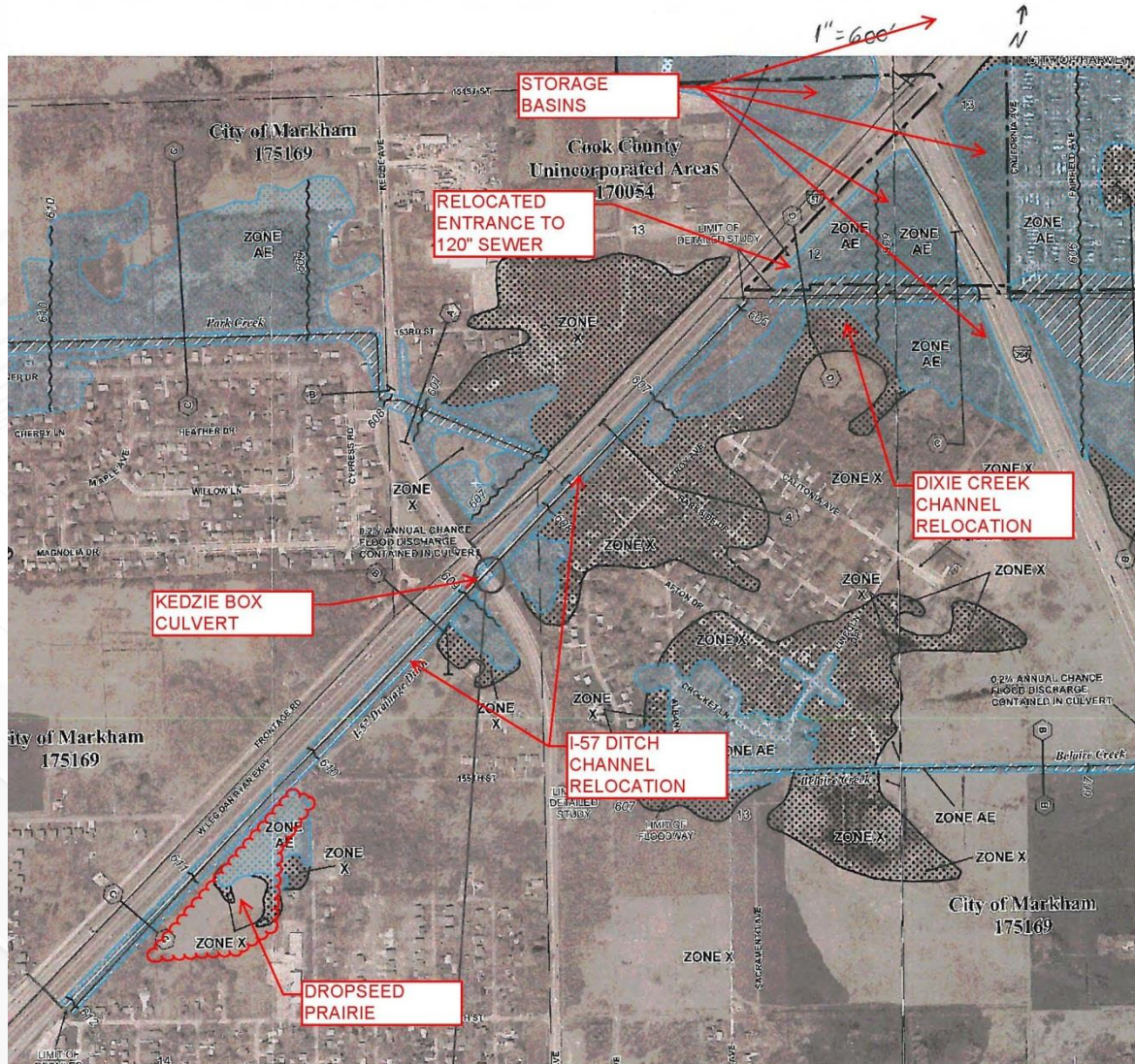


**Kedzie Avenue over I-57 Drainage Ditch  
120" RCP Storm Sewer, Looking  
Downstream**

# Dixie Creek Profile







# Design Features



# Dropseed Prairie

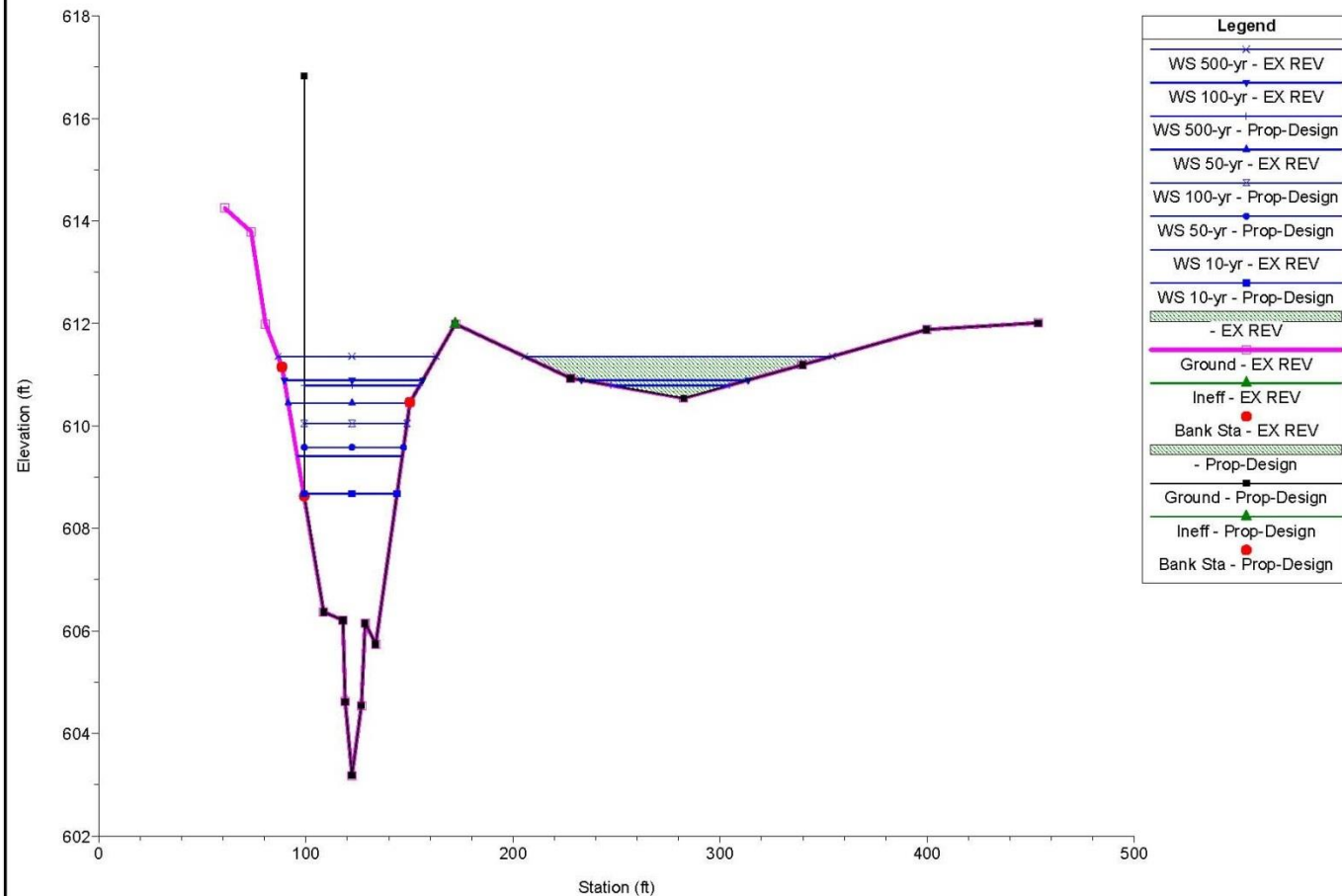


**Kedzie Avenue over I-57 Drainage Ditch**  
Looking Southeast at Approx. 1,654 ft.  
Upstream of Kedzie Avenue



# Retaining Wall

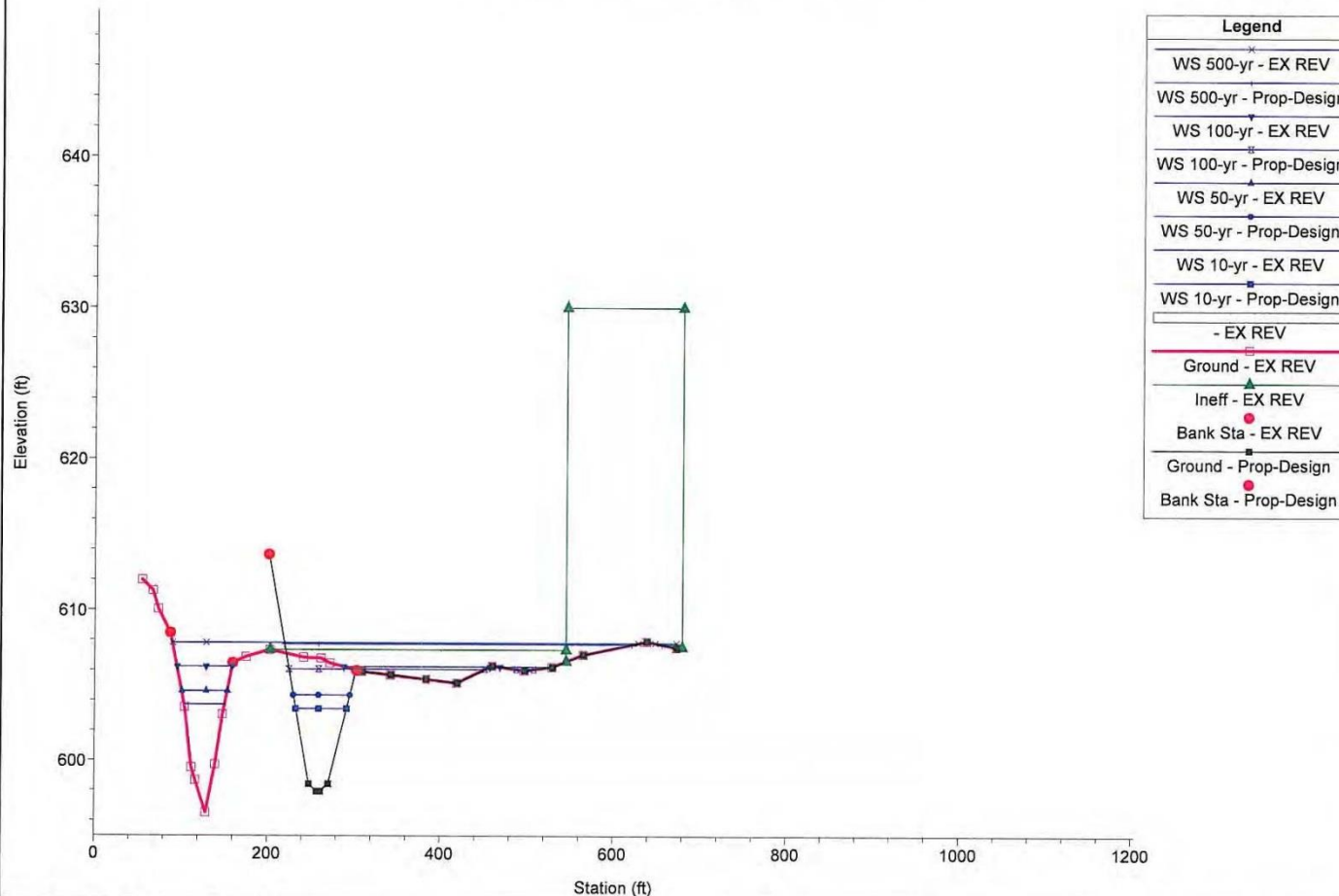
I-57 Drainage Ditch-VE Study Plan: 1) Prop-Design 2) EX REV  
RS = 37 Retaining Wall @ left side of XS





# Channel Relocation

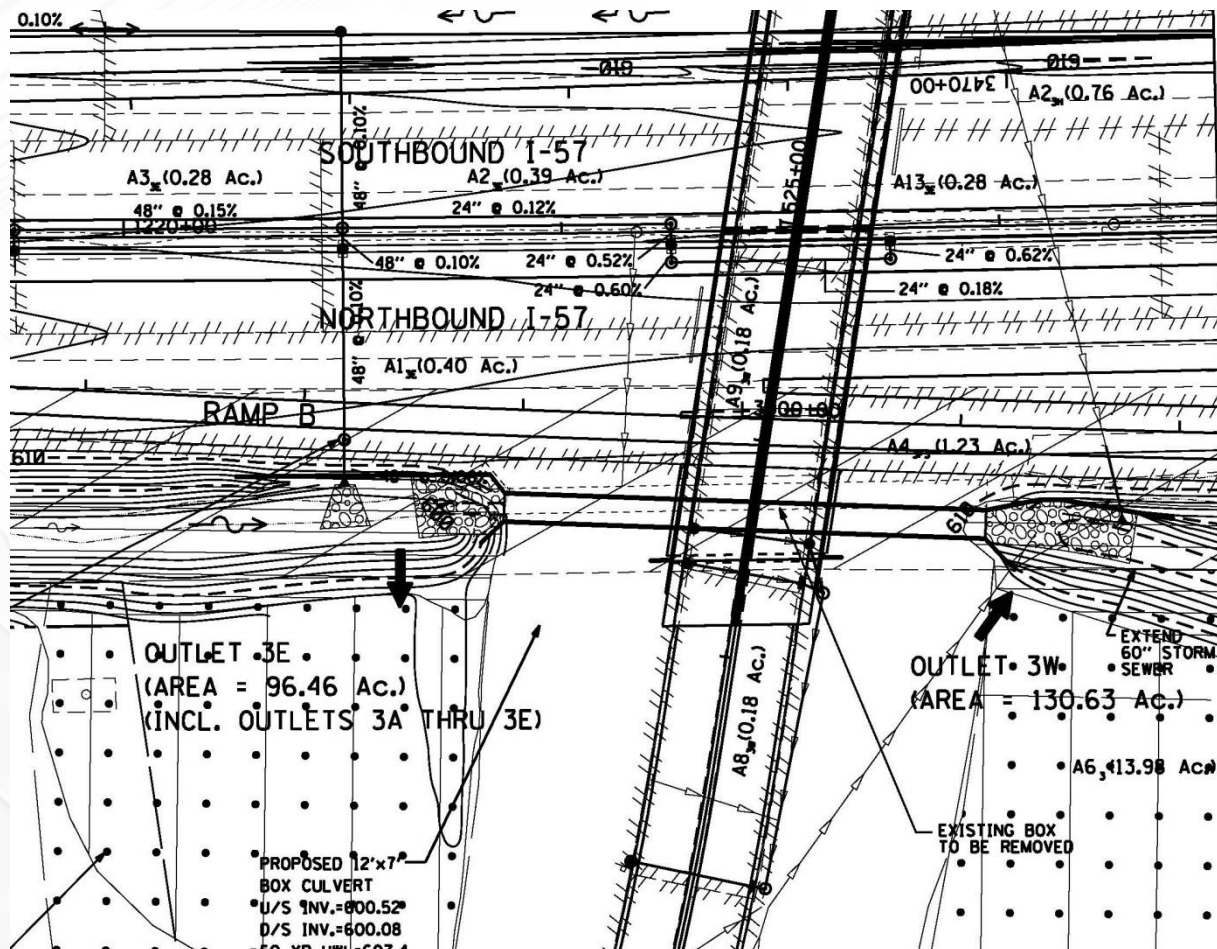
I-57 Drainage Ditch-VE Study Plan: 1) Prop-Design 2) EX REV  
River = I-57 Drainage Di Reach = Reach-2 RS = 18



1 in Horiz. = 175 ft 1 in Vert. = 10 ft

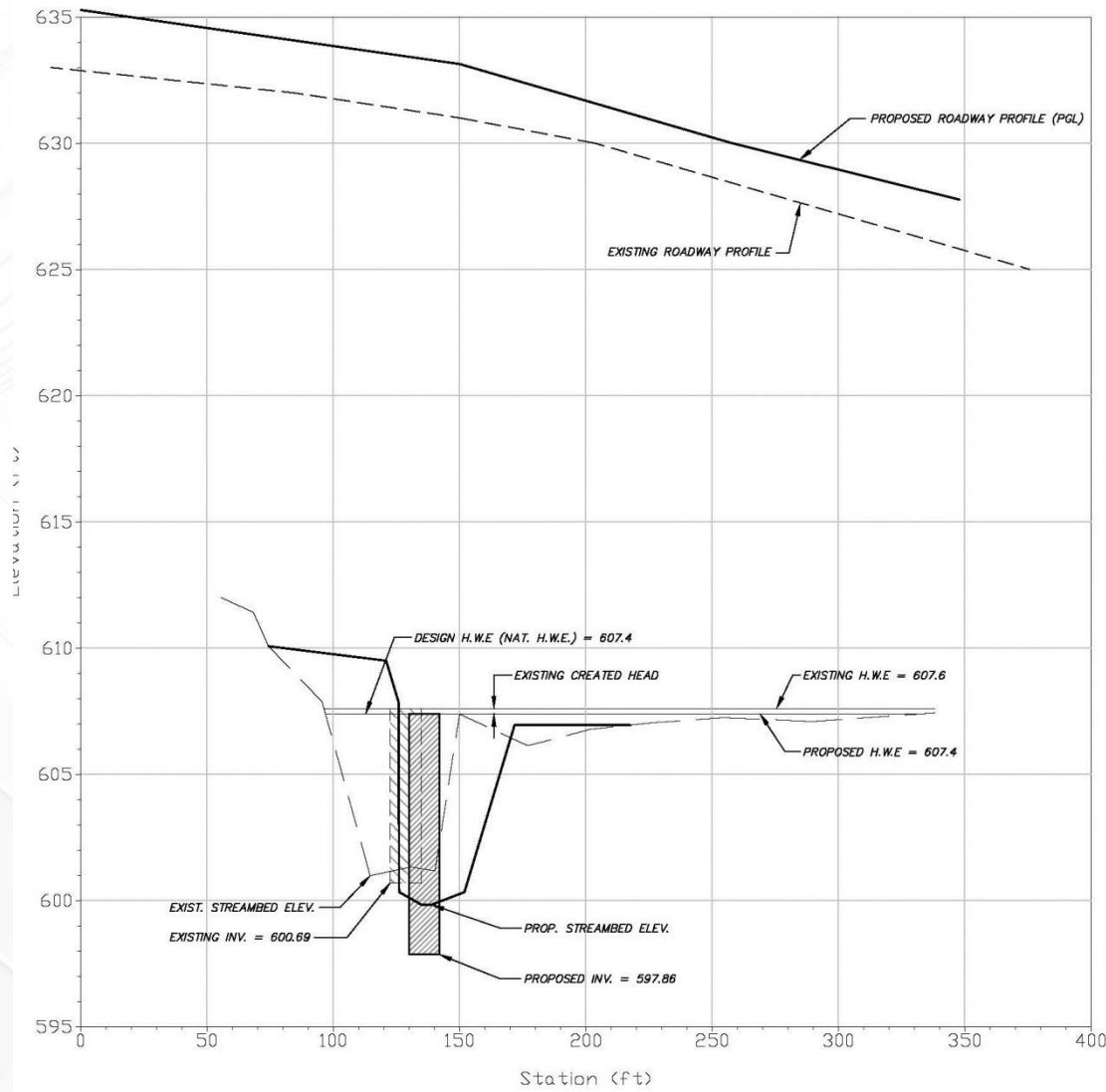


# Kedzie Culvert





# Kedzie Culvert



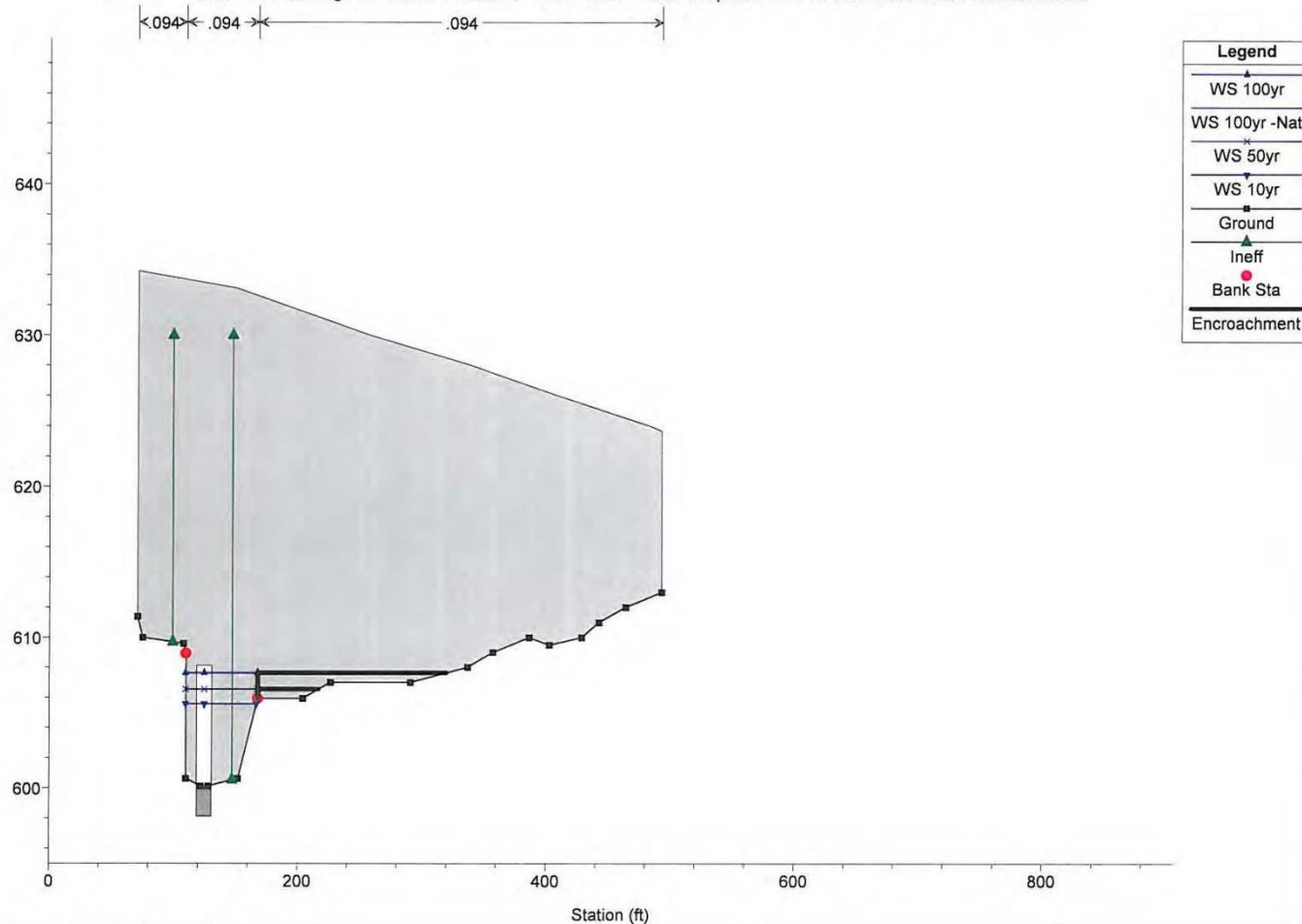


# Kedzie Culvert



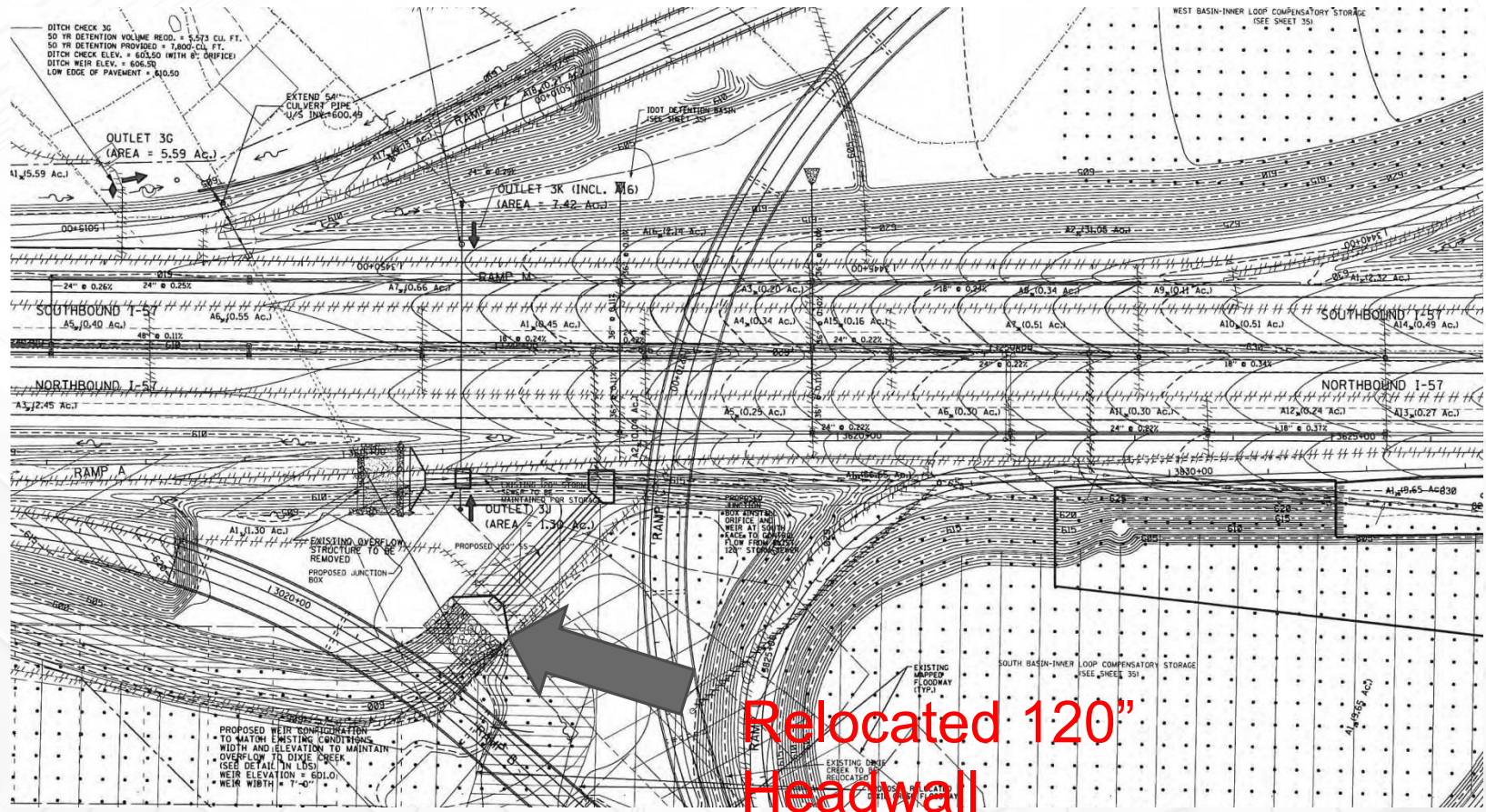
I-57 Drainage Ditch-VE Study Plan: Proposed - Floodway 2/23/2012

River = I-57 Drainage Di Reach = Reach-1 RS = 26.5 Culv Proposed 12' x 10' Box Culvert under Kedzie Avenue



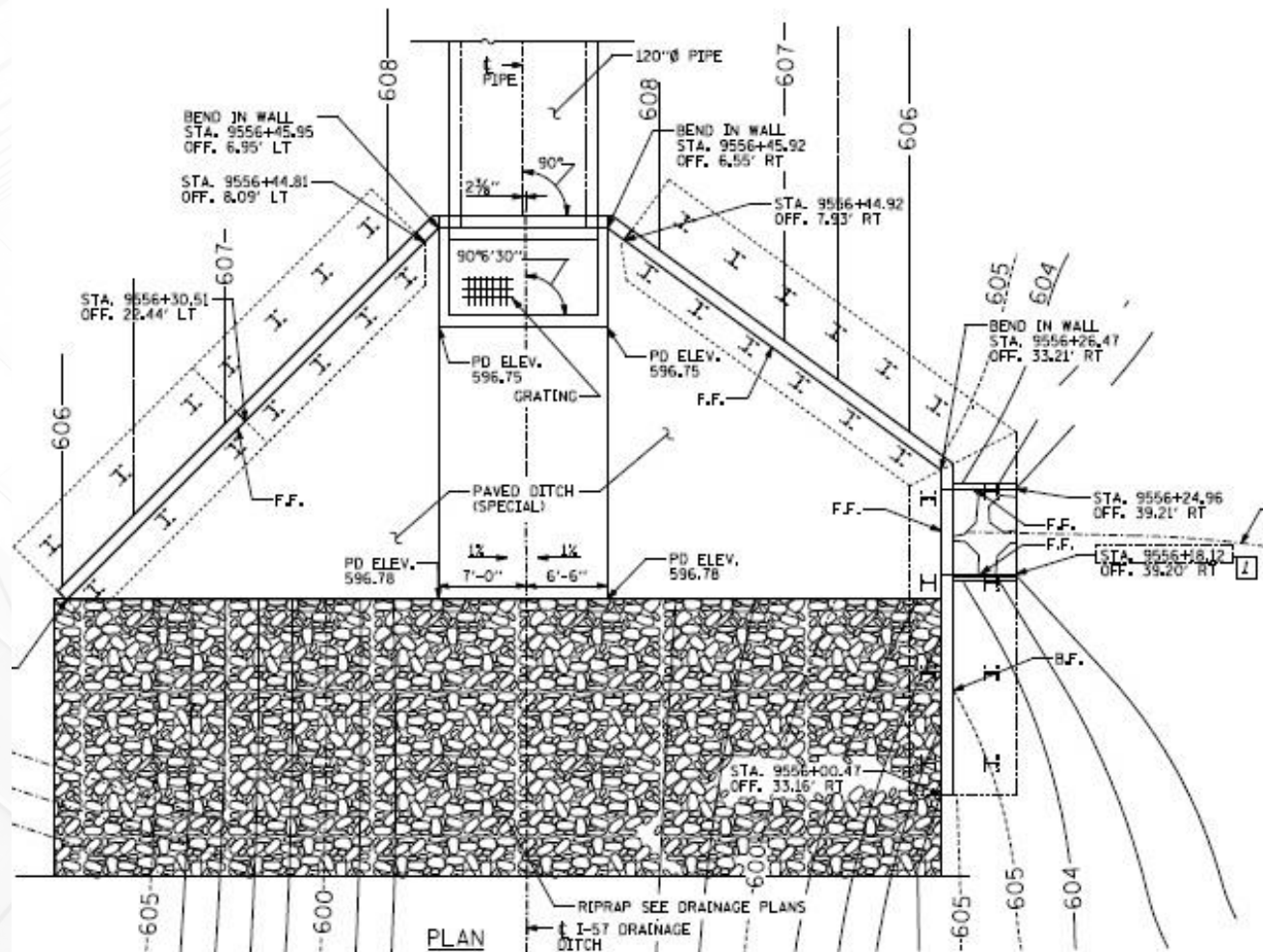


# Headwall Relocation



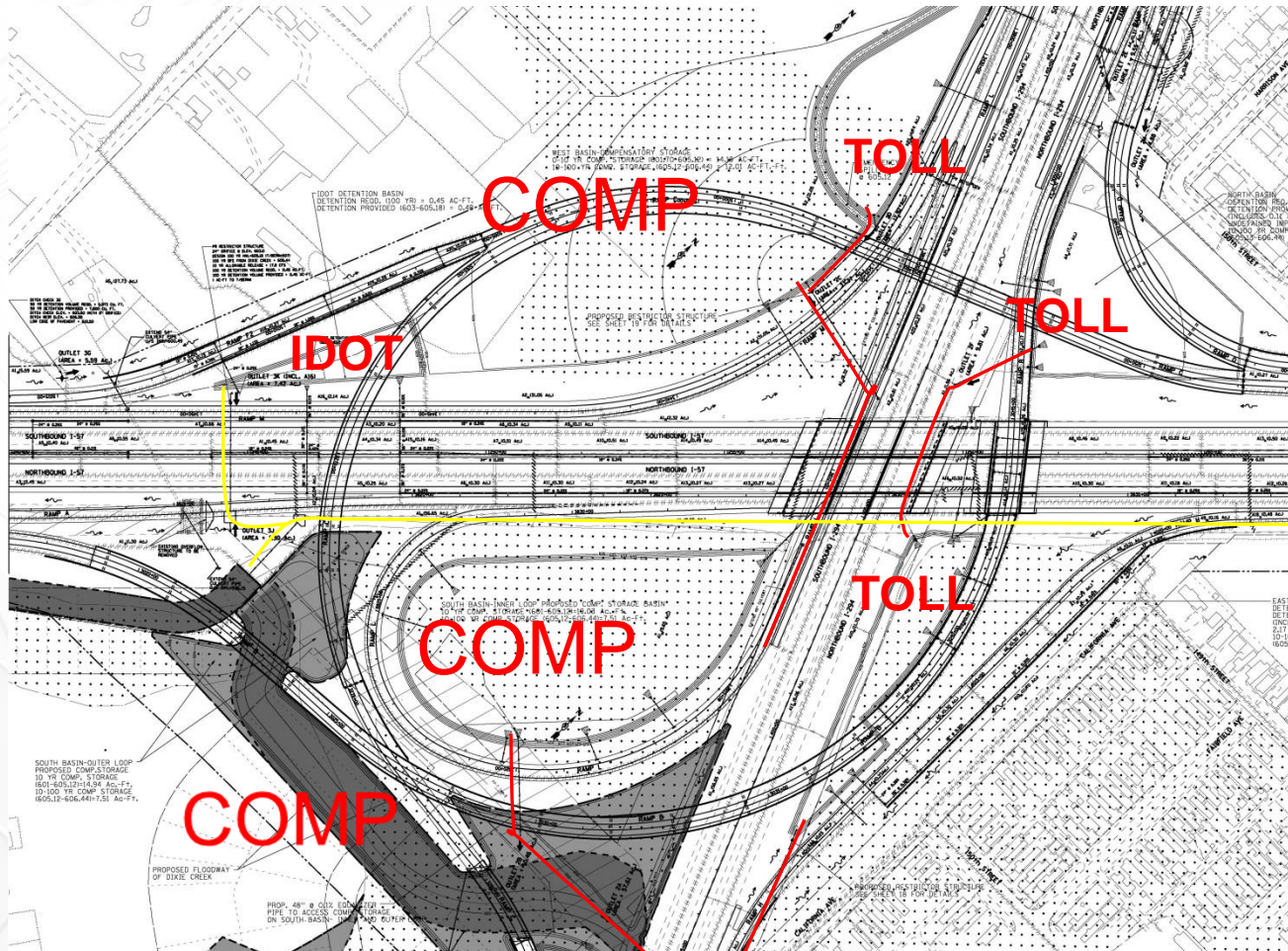


# Proposed Headwall





# Flood Storage



# Approvals Required

- IDOT – Hydraulic Reports
- Tollway – Hydraulic Reports
- IDNR – Floodway Permit & CLOMR concurrence
- Cook County & Markham – CLOMR signoff
- FEMA - CLOMR



# Hydraulic Models

- Effective – WSP2 (paper copy)
- Duplicate Effective – WSP2
- Duplicate Effective – HEC-RAS
- Modified Existing – HEC-RAS, surveyed
- Corrected Existing – raised n values
- Natural – Structures Removed
- Proposed
- Corrected Existing - Floodway
- Proposed - Floodway

# Conveyance & Velocity

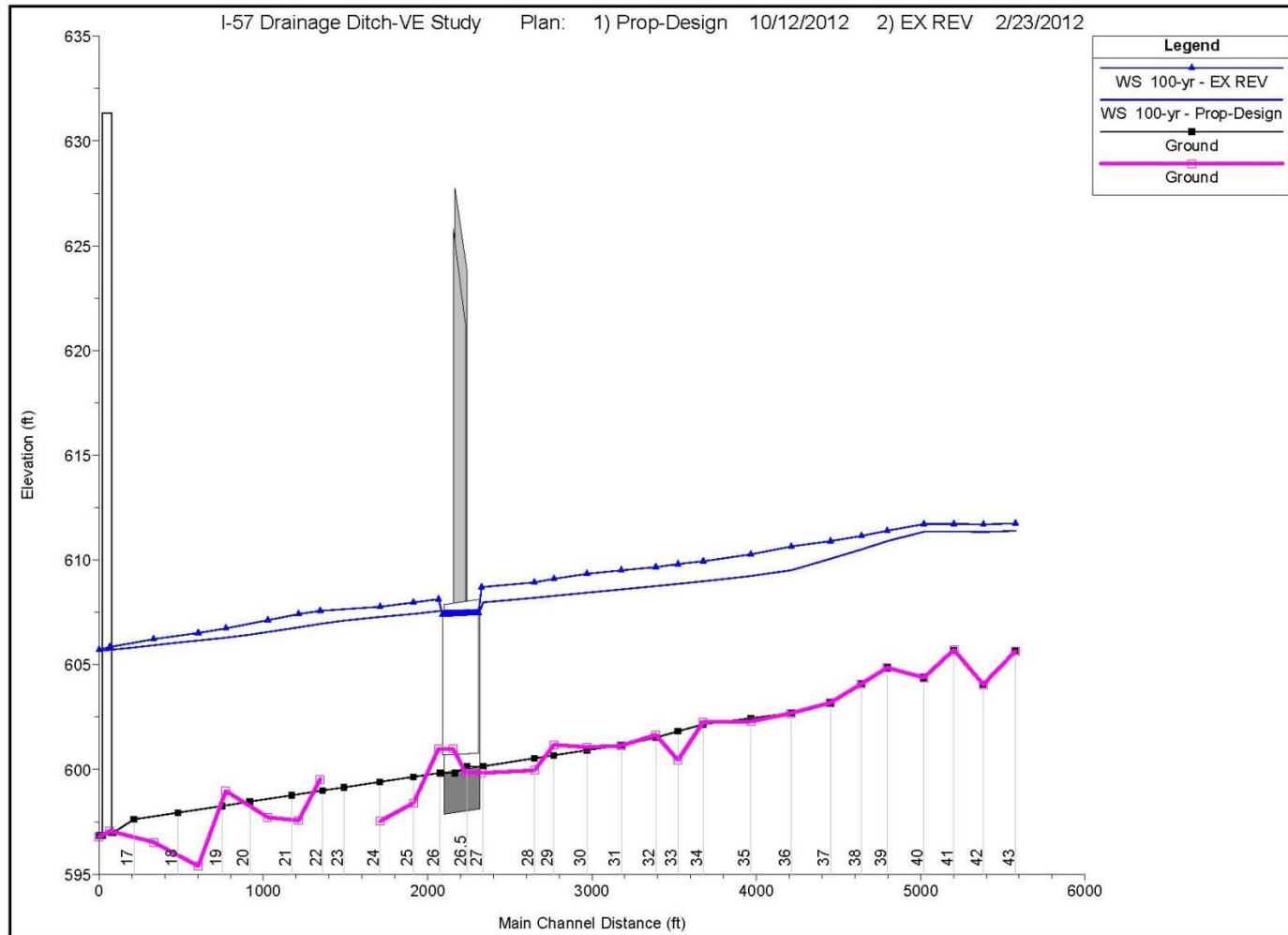


Existing Revised and Proposed Floodway Velocity and Conveyance (100-Year Frequency)

Cross Section	Description	Location	Floodway Velocity		Floodway Conveyance			Floodway Elevation	
			Existing Velocity	Revised Velocity	Existing Conveyance	Revised Conveyance	Difference	Existing WSE	Proposed WSE
(-)	(-)	(-)	(ft/s)	(ft/s)	(cfs)	(cfs)	(%)	(ft)	(ft)
43	New Survey XS	3,384 ft U/S of Kedzie Ave CL	2.4	2.7	36915	32466	-14%	* 611.7	611.4
42	New Survey XS	3,189 ft U/S of Kedzie Ave CL	2.7	3.0	30242	26002	-16%	* 611.7	611.3
41	New Survey XS	3,009 ft U/S of Kedzie Ave CL	2.0	2.2	44246	37937	-17%	* 611.7	611.4
40	New Survey XS	2,826 ft U/S of Kedzie Ave CL	1.6	1.7	9312	8079	-15%	* 611.7	611.3
39	New Survey XS	2,603 ft U/S of Kedzie Ave CL	1.7	1.9	8437	6947	-21%	* 611.4	610.9
38	New Survey XS	2,446 ft U/S of Kedzie Ave CL	1.7	2.0	8162	6320	-29%	* 611.2	610.5
37	New Survey XS	2,257 ft U/S of Kedzie Ave CL	1.4	1.9	9936	7208	-38%	* 610.9	610.1
36	New Survey XS	2,019 ft U/S of Kedzie Ave CL	1.4	2.0	10420	6807	-53%	* 610.7	609.5
35	New Survey XS	1,773 ft U/S of Kedzie Ave CL	1.8	1.3	6977	12036	42%	610.3	609.2
34	New Survey XS	1,483 ft U/S of Kedzie Ave CL	1.3	1.4	12472	11480	-9%	* 610.0	609.0
33	New Survey XS	1,329 ft U/S of Kedzie Ave CL	1.4	1.4	11032	11545	4%	609.8	608.9
32	New Survey XS	1,194 ft U/S of Kedzie Ave CL	1.5	1.4	10248	12129	16%	609.7	608.8
31	New Survey XS	985 ft U/S of Kedzie Ave CL	1.2	1.3	14110	12868	-10%	* 609.5	608.6
30	New Survey XS	776 ft U/S of Kedzie Ave CL	1.3	1.2	10637	12189	13%	609.4	608.5
29	New Survey XS	574 ft U/S of Kedzie Ave CL	1.4	1.2	9512	12537	24%	609.1	608.3
28	New Survey XS	456 ft U/S of Kedzie Ave CL	1.5	1.2	9484	12706	25%	609.0	608.2
27	New Survey XS	134 ft U/S of Kedzie Ave CL (U/S Face of culvert under Kedzie Avenue along I-57 Drainage Ditch)	1.1	1.3	18164	15748	-15%	* 608.7	608.0
26	New Survey XS	127 ft D/S of Kedzie Ave CL (D/S Face of culvert under Kedzie Avenue along I-57 Drainage Ditch)	2.2	2.1	9709	8973	-8%	* 608.2	607.6
25	New Survey XS	279 ft D/S of Kedzie Ave CL	1.3	1.2	11650	13482	14%	608.0	607.4
24	New Survey XS	483 ft D/S of Kedzie Ave CL	1.3	1.1	11906	14316	17%	607.8	607.3
23	New Survey XS	701 ft D/S of Kedzie Ave CL	1.4	1.3	17777	16972	-5%	* 607.6	607.1
22	New Survey XS	831 ft D/S of Kedzie Ave CL	1.7	1.5	13027	14788	12%	607.5	607.0
21	New Survey XS	1,019 ft D/S of Kedzie Ave CL	1.7	1.5	12813	14042	9%	607.2	606.8
20	New Survey XS	1,274 ft D/S of Kedzie Ave CL	1.8	1.5	11910	15415	23%	606.8	606.5
19	New Survey XS	1,442 ft D/S of Kedzie Ave CL	1.5	1.4	14903	16321	9%	606.5	606.3
18	New Survey XS	1,714 ft D/S of Kedzie Ave CL	1.6	1.3	15340	17635	13%	606.2	606.1
17	New Survey XS	1,980 ft D/S of Kedzie Ave CL	1.9	1.4	11525	16276	29%	605.8	605.8
16	New Survey XS	2,045 ft D/S of Kedzie Ave CL	1.9	1.4	11592	17445	34%	605.7	605.7



# Conveyance



# Match Elevations, Match Conveyance

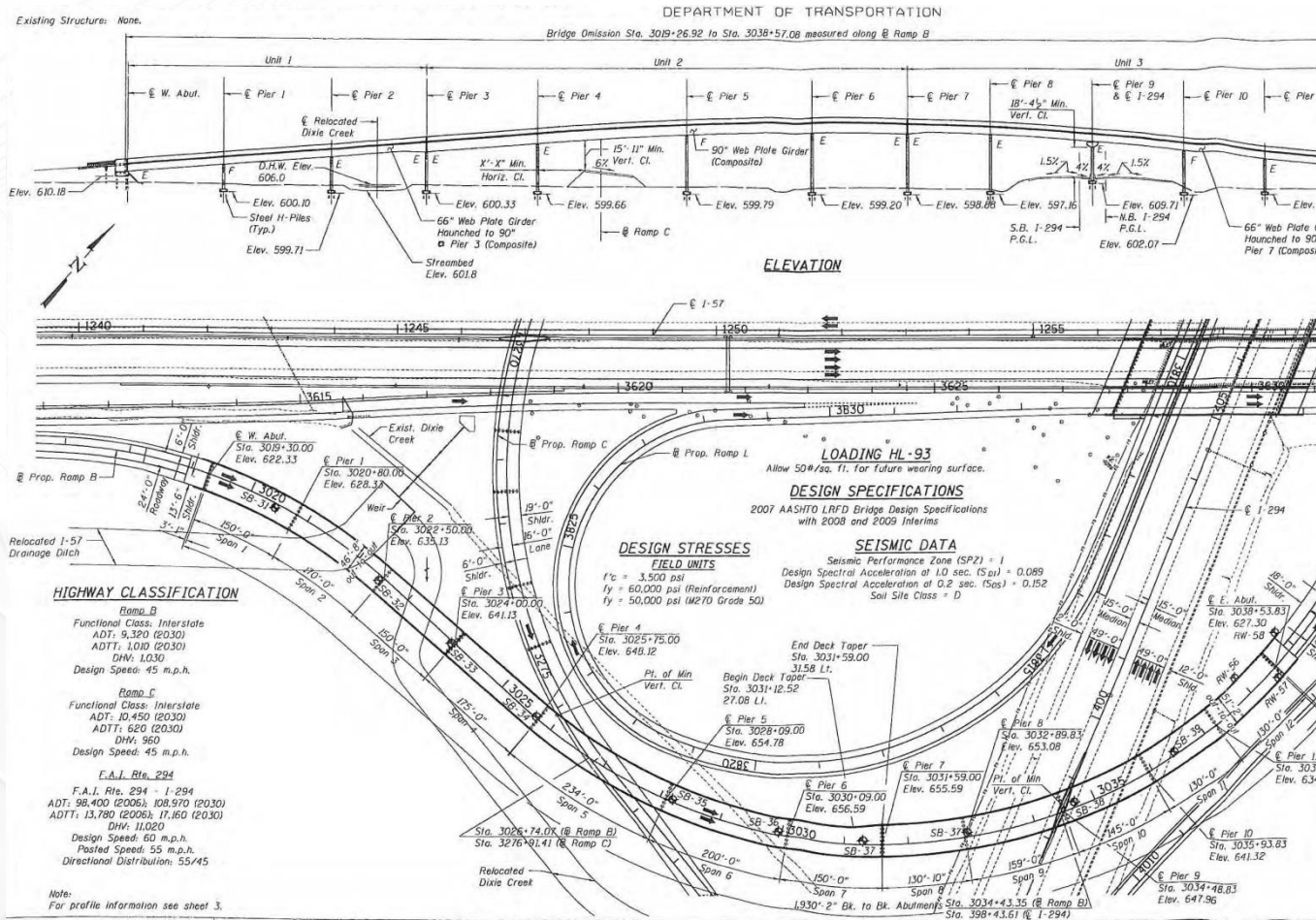


Existing Revised and Proposed Floodway Velocity and Conveyance (100-Year Frequency)  
(with Proposed Conveyance Check Run)

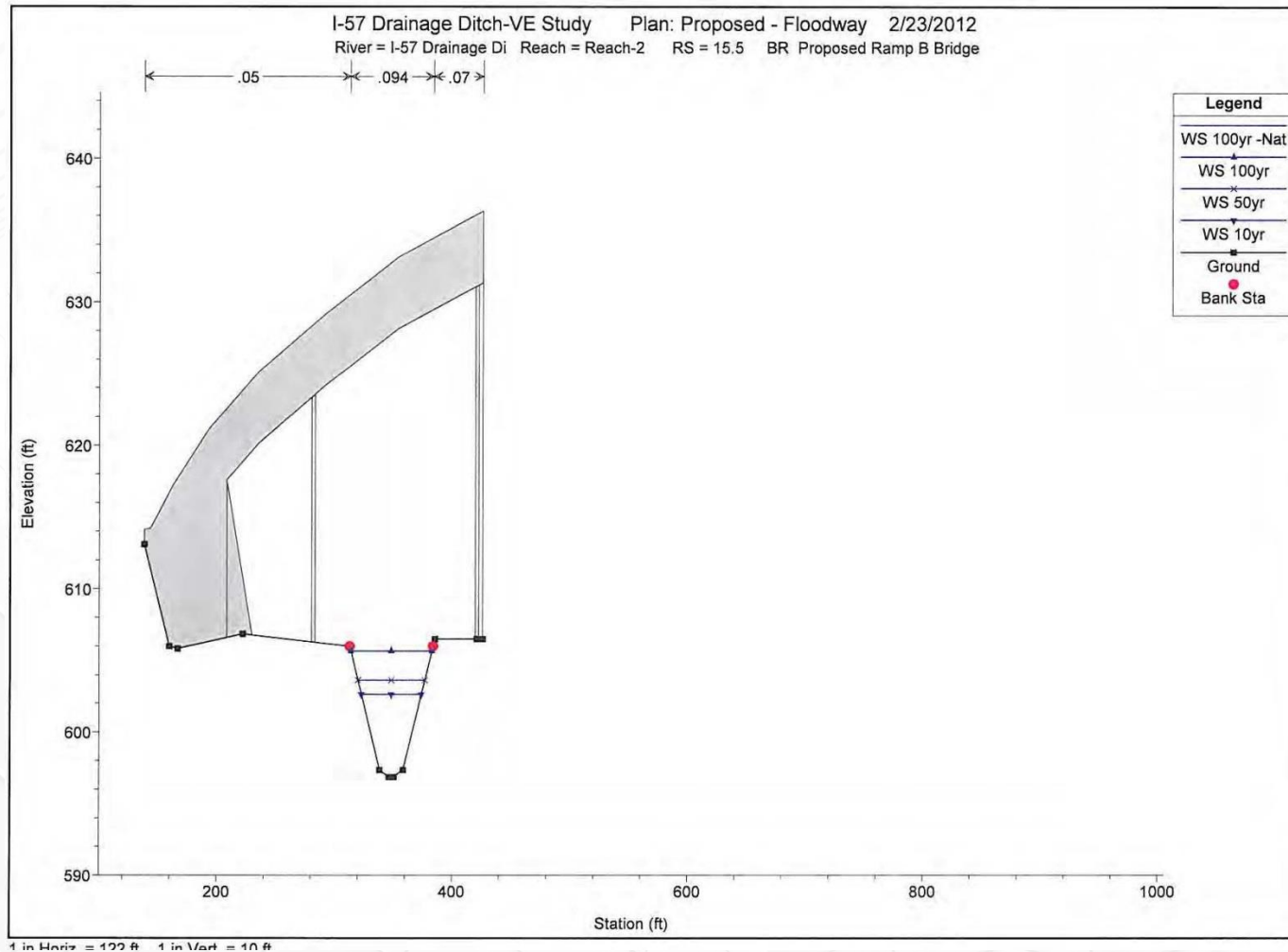
Cross Section	Description	Location	Floodway Velocity		Floodway Conveyance			Floodway Elevation	
			Existing Revised Velocity	Prop. Conveyance Check Velocity	Existing Revised Conveyance	Prop. Conveyance Check Conveyance	Difference	Existing Revised WSE	Prop. Conveyance Check WSE
(-)	(-)	(-)	(ft/s)	(ft/s)	(cfs)	(cfs)	(%)	(ft)	(ft)
43	New Survey XS	3,384 ft U/S of Kedzie Ave CL	2.4	2.4	36915	36902	0%	611.7	611.7
42	New Survey XS	3,189 ft U/S of Kedzie Ave CL	2.7	2.7	30242	30230	0%	611.7	611.7
41	New Survey XS	3,009 ft U/S of Kedzie Ave CL	2.0	2.0	44246	44230	0%	611.7	611.7
40	New Survey XS	2,826 ft U/S of Kedzie Ave CL	1.6	1.6	9312	9309	0%	611.7	611.7
39	New Survey XS	2,603 ft U/S of Kedzie Ave CL	1.7	1.7	8437	8434	0%	611.4	611.4
38	New Survey XS	2,446 ft U/S of Kedzie Ave CL	1.7	1.7	8162	8167	0%	611.2	611.1
37	New Survey XS	2,257 ft U/S of Kedzie Ave CL	1.4	1.5	9936	10219	3%	610.9	610.9
36	New Survey XS	2,019 ft U/S of Kedzie Ave CL	1.4	1.5	10420	10571	1%	610.7	610.7
34	New Survey XS	1,483 ft U/S of Kedzie Ave CL	1.3	1.2	12472	15247	18%	610.0	610.0
31	New Survey XS	985 ft U/S of Kedzie Ave CL	1.2	1.1	14110	16689	15%	609.5	609.5
27	New Survey XS	134 ft U/S of Kedzie Ave CL (U/S Face of culvert under Kedzie Avenue along I-57 Drainage Ditch	1.1	1.2	18164	18167	1%	608.7	608.7
26	New Survey XS	127 ft D/S of Kedzie Ave CL (D/S Face of culvert under Kedzie Avenue along I-57 Drainage Ditch	2.2	2.0	9709	9989	281%	608.2	608.2
23	New Survey XS	701 ft D/S of Kedzie Ave CL	1.4	1.2	17777	19067	7%	607.6	607.6



# Avoiding Piers

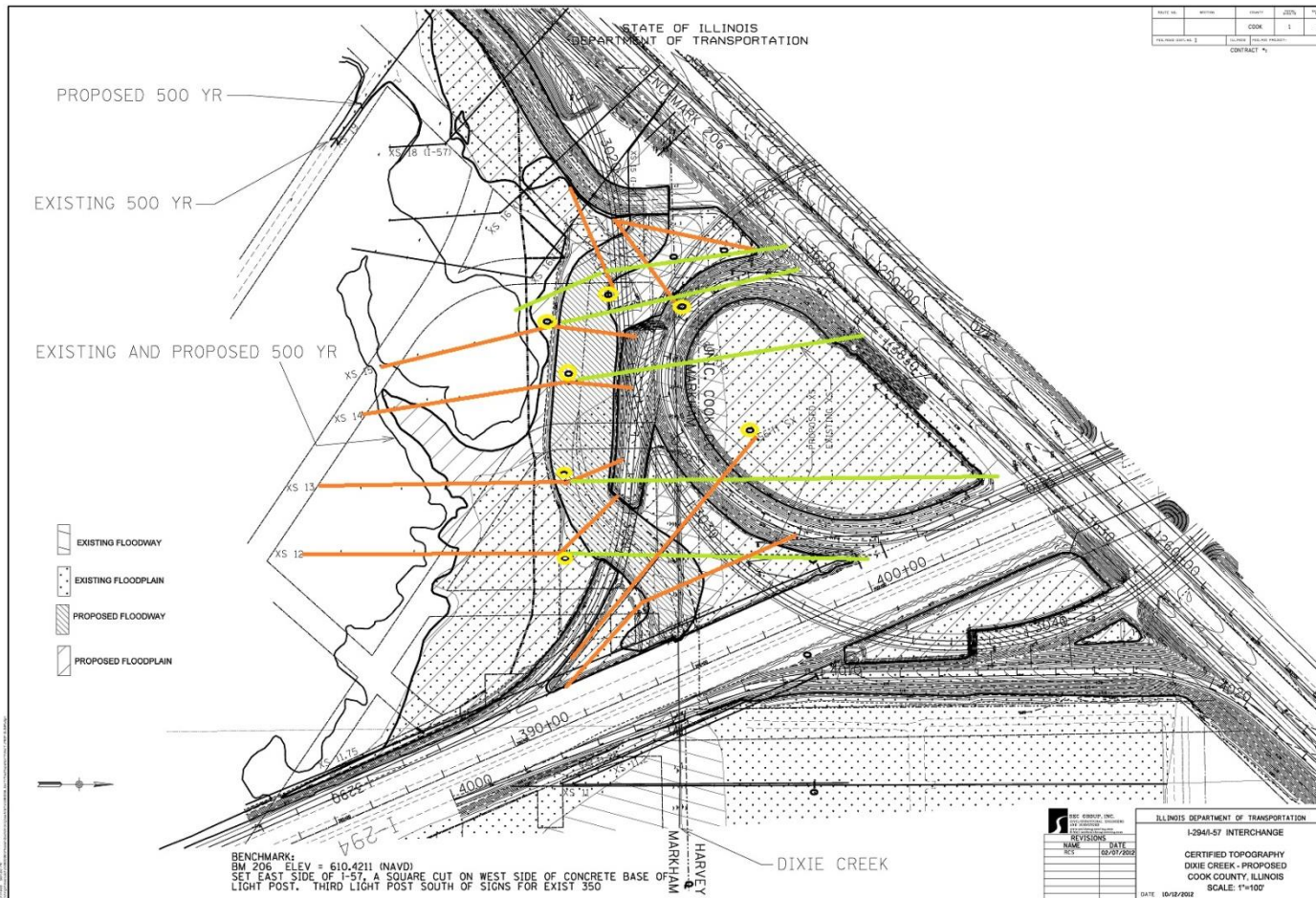


# Modeling Ramp Bridges

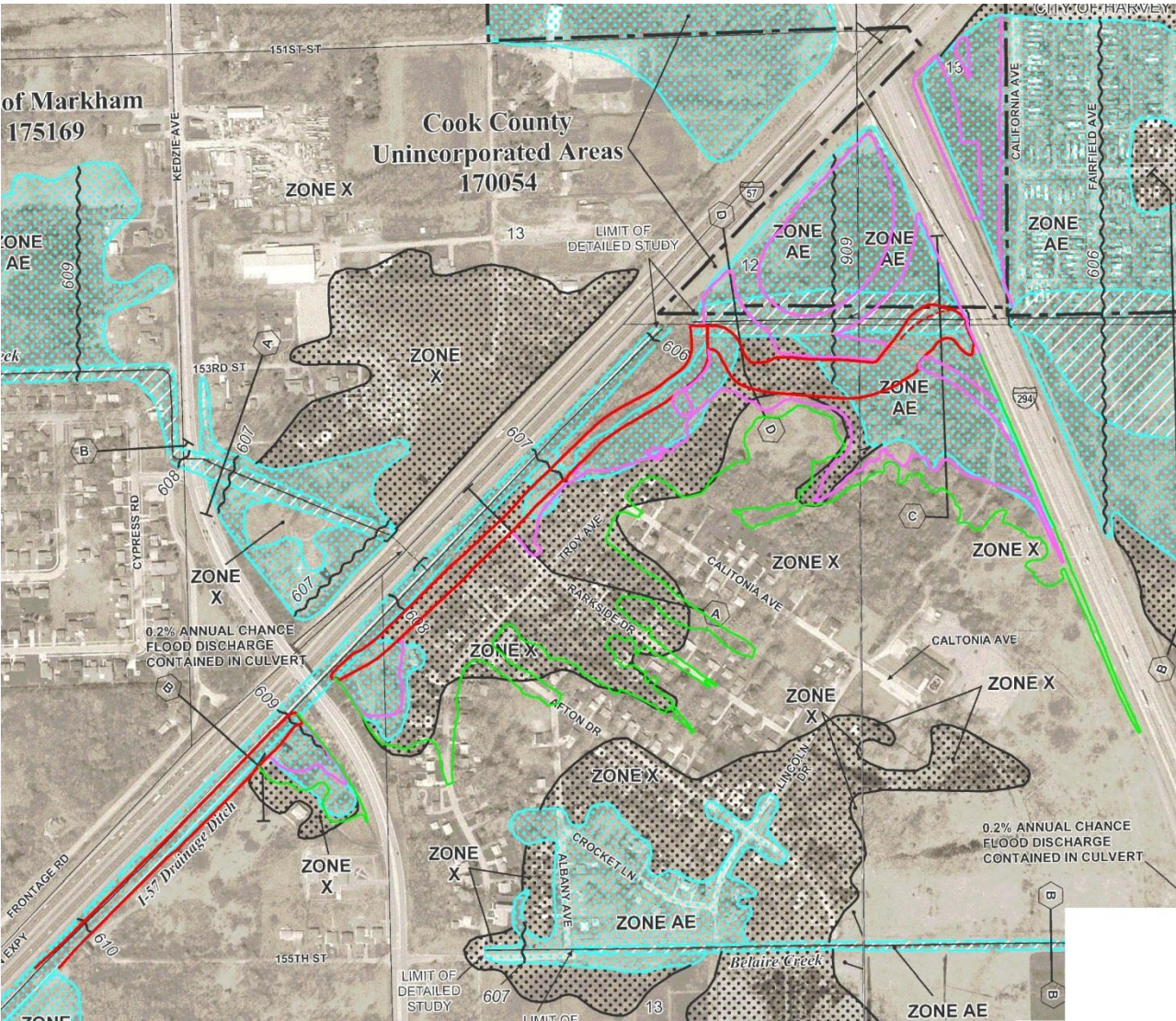




# Certified Topography







# Annotated FIRM





# QUESTIONS